

### Remarks

Applicants are grateful to the Examiner for the extensive reasoned response appended to the Advisory Action of March 12, 2009. Accordingly, a Request for Continued Examination is being filed concurrently herewith to permit further reconsideration of the application, as amended.

#### Claim rejections under 35 USC § 103

Claims 1, 3-9, 11, 12, 16, 20, 22, 23, 27, 28, 32 and 34 stand rejected under 35 USC § 103(a) as being unpatentable over Smart et al. (US 2002/0041637) in view of Shpantzer et al. (US 2002/0186435) and Shpantzer (Shpantzer: "A New Generation of Coherent ULH Fiber Optic Communication", OECC-2000 Conference).

This rejection is traversed in light of the foregoing amendments to the claims and the following comments.

Each of the independent claims is amended to require that the respective recited communications apparatus or method is operating at a data rate of at least 10Gbps. Basis for this limitation is found in the examples given at p.21, second paragraph and p.24, second paragraph, of the specification as filed.

This minimum data rate of 10 Gbps is several orders of magnitude greater than the data rates with which Smart et al. were concerned.

Smart et al. did not disclose anything which could suggest to a person of ordinary skill in the art that it would be possible to achieve a significant increase in the bandwidth of an optical communications system through the use of OFDM modulation. This is because Smart et al. were concerned only with data rates which could also be communicated over the limited bandwidth of RF or wired connections.

Smart et al. considered the problem of how to improve upon previously known OFDM transmitters and receivers (see Smart et al., paragraph [0028]). In this context, Smart et al. suggested an optical fiber merely as one of a number of examples of media which could be used to deliver the improved signals which they had developed. It is clear therefore, that

what Smart et al. propose is a modulated signal which can be transmitted over all of these media – including twisted pair cable; coaxial cable; or an RF propagation path, as well as optical fiber. Accordingly, the rates of the present invention are several orders of magnitude higher than could ever have been contemplated by Smart et al, since wired and RF links could not have accommodated the necessary bandwidth.

In summary, the invention as claimed is novel in view of Smart et al. at least by virtue of (i) operating at a data rate of at least 10Gbps and (ii) utilizing polarization multiplexing. Note that the novel feature of polarization multiplexing contributes to the achievement of the data rate of 10Gbps.

The Examiner has previously contended that Shpantzer '435 and Shpantzer NPL disclose the feature of polarization multiplexing and that, therefore, each of these documents remedies the deficiencies in the teaching of Smart et al., so that the combination of Smart et al and Shpantzer reads onto the claims.

However, Shpantzer teaches only that the polarization multiplexing can be used to double the capacity of the system – as indeed the Examiner has pointed out in the final Office Action of November 20, 2008. Thus, even if this teaching could be combined with that of Smart et al. (which Applicants do not accept) the combination would still not teach the skilled person to implement an optical communications system or method operating at 10Gbps or above. Instead, the highest data rate that the skilled person could arrive at, based on this notional combination of teachings, would be twice the maximum data rate envisaged by Smart et al. Any such conceivable data rate is still far exceeded by the 10Gbps rate specified in each of the independent claims.

Therefore, the combination of Smart and Shpantzer does not render the invention, as claimed, obvious. On the contrary, the subject matter of the independent claims represents a substantial advance in optical communications and – by virtue of this contribution to the art – is non-obvious in view of the references.

Claims 22-30, and 32 also stand rejected under 35 USC § 103(a) as being unpatentable over Dolgonos et al. (US 2002/0137464) in view of Shpantzer '435; Shpantzer NPL; and various other references.

Similar arguments to those above apply to Dolgonos et al. This reference, in the field of wireless communications, discloses relaying a wireless OFDM signal over an optical link. This makes clear that the bandwidth of the signal under consideration is that of the wireless OFDM signal being relayed. Implicitly, therefore – as for the disclosure of Smart et al. – the data rate of the optical transmission (using OFDM) is limited to that which could also be accommodated over a wireless link.

Indeed, in this case, it is possible to more accurately quantify the data rates contemplated, since Dolgonos et al. refer explicitly to the DAB and DVB-T standards. The maximum data-rate supported by a channel in a DVB-T system is less than 32Mbps. A typical maximum bit-rate for a DAB system is around 1.2 Mbps.

By the same reasoning described above, the highest data rates that the skilled person could learn from a combination of the teachings of Shpantzer and Dolgonos would be twice the bit rates envisaged by Dolgonos (on the basis that polarization multiplexing would be successfully applied to double the capacity). Therefore, the skilled person would – at best – be taught a maximum bit rate in the region of 64Mbps. Compared to this absolute maximum figure, the data rate of 10Gbps of the present invention represents a speed increase by factor of more than 150.

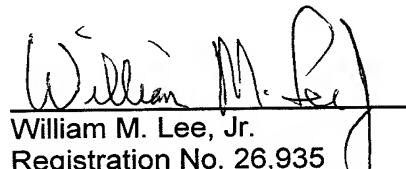
Applicants note that Dolgonos et al.; the two Shpantzer references; and indeed Smart et al. all bear publication dates in 2002. The filing date of the present application was October 6, 2003. A data-rate increase of more than two orders of magnitude in such a short space of time is indicative of the significant inventive step made by the inventors.

For these reasons, Applicants respectfully submit that the subject-matter of the amended independent claims is non-obvious in view of Dolgonos et al., as it is in view of Smart et al., or any combination of their teachings or combination of them and the cited secondary references.

A Petition for Extension of Time is also submitted herewith.

March 19, 2009

Respectfully submitted,

  
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